What is claimed is:

1. A linear actuator comprising:

a stator assembly shaped into a cylinder defining a hollow, the stator assembly including

a plurality of windings,

a plurality of stator yokes each having an array of pole teeth which define an inner circumference of the stator assembly and which are excited by each of the windings, and

a yoke support member formed of resin by injection-molding, and integrally supporting the windings and the stator yokes;

a rotor assembly shaped into a hollow-cylinder, and rotatably housed in the hollow of the stator assembly, the rotor assembly including

a ring-shaped magnet constituting an outer circumference of the rotor assembly, and opposing the pole teeth of the stator assembly with a clearance therebetween, and

a female screw disposed at an inner circumference of the rotor assembly;

a rear end cap positioned at a rear end of the stator assembly, integrally formed of the resin injected simultaneously when injection-molding the yoke support member of the stator assembly, and rotatably supporting a rear end of the rotor assembly;

a front end protrusion positioned at a front end of the stator assembly, shaped into a ring concentric with the stator assembly, having an inner diameter larger than a diameter of the hollow of the stator assembly, and integrally formed of the resin injected simultaneously when injection-molding the yoke support member of the stator assembly;

a front bearing defining an opening at its center, detachably fitted into the

front end protrusion, and rotatably supporting a front end of the rotor assembly;

an output shaft having a male screw which is formed at a rearward portion thereof and which engages threadedly with the female screw of the rotor assembly, the output shaft going through the opening of the front bearing and through the rotor assembly; and

a front end cap disposed at the front end of the stator assembly, having a hole for supporting movably and guiding the output shaft, and attached to the stator assembly so as to be fitted onto an outer circumference of the front end protrusion.

2. A linear actuator according to Claim 1, further comprising a bearing provided at the rear end cap so as to rotatably support the rear end of the rotor assembly.

3. A production method of a linear actuator, the production method comprising the steps of:

a stator assembling process, at which a stator assembly, a rear end cap, and a front end protrusion are simultaneously and integrally produced by resin injection-molding: wherein the stator assembly is shaped into a cylinder defining a hollow, and includes in an integrally holding manner a plurality of windings, and a plurality of stator yokes each having an array of pole teeth which are excited by the windings and which constitute an inner circumference of the stator assembly; the end cap is formed at a rear end of the stator assembly so as to cover at least a portion of the hollow of the stator assembly; and wherein the front end protrusion is formed at a front end of the stator assembly, shaped into a ring concentric with the stator assembly, and has an inner diameter larger than a diameter of the hollow of the stator assembly;

a rotor assembling process, at which a rotor assembly is produced that is shaped into a hollow-cylinder, has a ring-shaped magnet constituting an outer circumference thereof and opposing the pole teeth of the stator assembly, and that has a female screw disposed at an inner circumference thereof.;

a motor assembling process, at which the rotor assembly is put in the hollow of the stator assembly, and a bearing having an opening at its center is press-fitted to an inner circumference of the front end protrusion thereby producing a motor portion wherein rear and front ends of the rotor assembly are rotatably supported respectively by the rear end cap and the bearing fitted into the front end protrusion;

an output shaft attaching process, at which an output shaft having a male screw formed at a rearward portion thereof is inserted through the opening of the bearing so as to make the male screw engage threadedly with the female screw of the rotor assembly whereby the output shaft moves linearly in an axial direction when the rotor assembly rotates; and

a front end cap attaching process, at which a front end cap having a hole for supporting movably and guiding the output shaft is attached to the front end of the stator assembly.

4. A production method of a linear actuator according to Claim 3, further comprising a motor characteristic evaluation process which is performed after the motor assembling process and before the output shaft attaching process, and at which the rotor assembly put in the stator assembly is rotated by exciting the pole teeth thereby evaluating a rotation characteristic of the rotor assembly with respect to the stator assembly.

5. A production method of a linear actuator according to Claim 4, wherein the motor characteristic evaluation process is performed by checking noises generated by rotation of the rotor assembly.

6. A production method of a linear actuator according to Claim 3, wherein a bearing to rotatably support the rear end of the rotor assembly is attached to the rear end cap before the rotor assembly is put in the hollow of the stator assembly at the motor assembling process.

7. An inspection method of a linear actuator which comprises:

a stator assembly shaped into a cylinder defining a hollow, the stator assembly including

a plurality of windings,

a plurality of stator yokes each having an array of pole teeth which constitute an inner circumference of the stator assembly and which are excited by each of the windings, and

a yoke support member formed of resin by injection-molding, and integrally supporting the windings and the stator yokes;

a rotor assembly shaped into a hollow-cylinder, and rotatably housed in the hollow of the stator assembly, the rotor assembly including

a ring-shaped magnet constituting an outer circumference of the rotor assembly and opposing the pole teeth of the stator assembly with a clerance therebetween,

a female screw disposed at an inner circumference of the rotor assembly;

a rear end cap positioned at a rear end of the stator assembly, formed of the resin injected simultaneously when injection-molding the yoke support member of the stator assembly, and rotatably supporting a rear end of the rotor assembly;

a front end protrusion positioned at a front end of the stator assembly, shaped into a ring concentric with the stator assembly, having an inner diameter larger than a diameter of the hollow of the stator assembly, and

formed of the resin injected simultaneously when injection-molding the yoke support member of the stator assembly;

a front bearing having an opening at its center, detachably fitted to the front end protrusion, and rotatably supporting a front end of the rotor assembly;

an output shaft having a male screw which is formed at a rearward portion thereof and which engages threadedly with the female screw of the rotor assembly, the output shaft going through the opening of the front bearing and through the rotor assembly; and

a front end cap disposed at the front end of the stator assembly, having a hole for supporting movably and guiding the output shaft, and attached to the stator assembly so as to be fitted onto an outer circumference of the front end protrusion,

the inspection method comprising the steps of:

rotating the rotor assembly such that the pole teeth of the stator assembly are excited by causing current to flow in the windings after the rotor assembly is set in the hollow of the stator assembly, after the front bearing is attached to the front end protrusion, and before the output shaft is inserted through the rotor assembly; and

performing a motor characteristic evaluation in which a rotation characteristic of the rotor assembly is evaluated by checking noises generated by the rotor assembly rotating with respect to the stator assembly.